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ABSTRACT

The influence of the number of pictures in college textbooks on students' understanding of the text was studied. For six history texts, the numbers of pages, maps, and pictures were compared. Charts, graphs, and diagrams of processes were not counted. While the number of pages and the number of maps in these books have not changed significantly, the number of pictures has increased. To determine whether pictures improve students' reading comprehension, a 1,108-word passage was illustrated with three pictures. Following reading of the passage, students completed 15 multiple-choice comprehensive questions that tested both literal and implied meanings, as well as a vocabulary test. For 140 students in eight classes, half the classes were tested with the pictures and half without pictures. No significant differences in the performance of the two groups occurred. In a second study with 145 students, 119 chose a handout with a reading passage illustrated with pictures, while only 26 chose a passage without pictures. It is concluded that while there seems to be no cognitive benefit for increasing the use of pictures, they seem to have an affective impact on students. (SW)

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College Reading and Learning Assistance

Technical Report 85-02

Do Pictures Make a Difference in College Textbooks?

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Summary: Although the number of pictures in college textbooks has increased dramatically in the past two decades, the pictures do not seem to increase a student's understanding of the text based on the groups compared in this study. On the other hand, when given a choice of reading material with or without pictures, students overwhelmingly chose the illustrated text.

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Do Pictures Make a Difference in College Textbooks?

The first and most obvious change that strikes a reader when comparing college social science textbooks popular in the 1960's and in the 1980's is the proliferation of pictures. The number of pictures has not merely doubled or tripled; in many cases pictures have increased exponentially.

The data in Table 1 illustrate this dramatic shift. Six history texts, published by major companies and selected because of their popularity and availability, were compared. For each text, the number of pages, number of maps, and number of pictures are listed. The pictures in these counts are generally pictures of people, landscapes, buildings, and artifacts; the counts do not include charts, graphs, and diagrams of processes. Note that the number of pages and the number of maps in these books have not changed significantly, but the number of pictures has increased, in the first example in each column, from one every 59.1 pages to one every 1.5 pages.

(Table 1 about here.)

The logical questions which emerges from such comparisons is, "What purpose do the pictures serve?" and, "Do the pictures contribute to reading comprehension and vocabulary development?"

Review of Relevant Literature

The literature on the relationship between pictures and reading comprehension points in two directions. Most of the research conducted prior to 1975 seems to indicate that pictures have a negative effect on reading comprehension, whereas research after 1975 points to a positive relationship. To judge the relevance of this

research to the relationship of college textbook pictures and reading comprehension, it is important to look more specifically at the studies. In a 1970 review, Samuels, a leading investigator of picture research, concluded that pictures interfere with the acquisition of sight vocabulary and that pictures do not facilitate comprehension. To substantiate his claim, Samuels cited his own research (1967), which was conducted primarily with kindergarten and first grade children, along with the work of Silverman, Davids, and Andres (1963), Baker and Madell (1965), Braun (1969), and Harris (1967). Concannon reached a similar conclusion in a 1975 review, but again, his research was based primarily on sight vocabulary development with very young children.

A study cited by Samuels, but with contradictory findings, is Koenke's (1968) investigation, using third and sixth grade students. He found no difference in the ability of the students to state the main idea of illustrated and non-illustrated versions of a story.

In a 1980 review of the literature, Schallert (1980) indicates that many researchers have found that pictures do facilitate the comprehension and retention of text. In fact, Schallert cites several studies of first graders that contradict the earlier conclusion of Samuels. Lesgold, Levin, Shimron, and Gutterman (1975) tested the comprehension of first graders on narrative stories and found that illustrated stories were remembered better than non-illustrated ones. In another study, Lesgold, DeGood, and Levin (1977) found illustrations helpful with longer, more complex stories and that pictures which specifically represent information enhanced retention. In addition, Levin, Bender, and Lesgold (1976) found that first

raders benefitted more from the addition of a picture than from hearing a word or sentence repeated. Schallert concludes, after analyzing a study by Rohwer and Harris (1975) of fourth graders, that "Pictures can facilitate comprehension if they depict information that is central to the text and that is tapped in the comprehension measures."

Two studies conducted with college students seem to confirm Schallert's conclusion. Rigney and Lutz (1976) asked college students to learn the concepts of electrochemistry involved in a simple primary cell. For half the students, definitions were elaborated in a graphic display, whereas, the other students read a description of what the illustrations represented. The picture group showed superior comprehension on this task in which the information in the picture was critical to the text. In another study, Royer and Cable (1976) concluded that a beginning passage with a line drawing about the structural relationships of objects helped college students better understand a second passage written in abstract terms.

Both studies involving college students used technical illustrations essential to the understanding of the passage. In a study with seventh graders, Hayes and Readence studied the varied level of dependence of illustrations on the text by, in one case forcing students to attend to the illustrations, and in another not calling the illustrations to the attention of the students. They found that "illustrations enhance transfer of learning from text to the extent that the text depends on the illustration." The majority of the pictures in college history books are neither technical illustrations nor are they referred to directly in text; therefore, the text is not picture dependent. Maps, often an integral part of

text, have not increased in number. The comparison of the 1960's and 1980's textbooks does show that pictures, which are rarely an integral part of text, have increased. Do these pictures make a difference?

Research Study

The purpose of the study is to examine the effects of pictures in college textbooks on reading comprehension. Do pictures, the kind that are typically included in college textbooks, really improve a student's understanding of the material? To answer that question, a passage from a history book was chosen. The 1108-word passage discusses the changing role of women in society in the 1800's. The contributions of three women are initially highlighted, followed by a general discussion of the increased responsibility assumed by women during the Civil War. In keeping with the trend in United States history textbooks of depicting people, the investigators selected three pictures of women to illustrate the passage. The first picture, a drawing of a bloomer girl on a bicycle, was placed at the beginning of the passage. The second, a picture of Sojourner Truth, appeared in the middle of the passage, and the last, a picture of a woman working in the fields, was placed at the end. The pictures specifically supported the text. The contributions of Amelia Bloomer and Sojourner Truth are specifically discussed and serve as illustrations of two trends which the passage describes. The third picture also directly supports the text as it portrays a woman taking part in a tasks theretofore left for men.

Following the reading of the passage, students were asked to complete fifteen multiple-choice comprehension questions that tested both literal and implied meanings and a ten-item vocabulary test. The

passage and questions, but not the pictures, also appear on pages 133-135 of Bridging the Gap: College Reading, 2nd edition.

The subjects for the study were students in developmental reading classes at Georgia State University. A total of 140 students in eight different classes was tested. By random selection, four of the classes were given the history passage with pictures and the other four received the history passage without pictures. Students were allowed fifty minutes to read the passage and answer the questions.

Findings

Student comprehension and vocabulary scores were derived and mean scores for each group were calculated. A T-test was used to test for significance (see Table 2). The alpha level was set at .05.

(Table 2 about here.)

There is no significant difference in the performance of the two groups on the measures of reading comprehension and vocabulary depending on whether the passage which the student read included pictures or did not include pictures.

Follow-up Study

Following the completion of the research study described above, one of the instructors who had conducted part of the experiment used the passage for instructional purposes with a class which had not participated in the study. She did not have enough copies of the passage with pictures for everyone in the class; she completed a class set with copies of the passage without pictures. She instructed students informally to pick up a copy of the passage and read it for further discussion. She noticed that students chose the passage with pictures until they ran out, and only then did students pick up copies without pictures. She reported this phenomenon to the researchers.

The following quarter, a second study was conducted to formally test student preference for passages with pictures: Do students prefer reading textbook material with or without pictures? Students in developmental reading classes at Georgia State University were used for the study; classes, however, were chosen for this study only if they did not include students who had been involved in the study the previous quarter. For this study, 145 students in seven different reading classes were tested. The same two forms of the history passage on the changing role of women were used: one included three pictures which directly supported the text; the other included no pictures.

Students were asked to read the passage for a class discussion. Instructors told the class that they had brought two sets of the passage because they were not certain whether there were enough of either set for everyone in the class. In fact, there were enough of both sets for every student in the class. Students were further told, this time truthfully, that each set was exactly alike in information and number of words; the only difference was that one had pictures and one did not. The passages were placed side by side near the instructor's desk. After these instructions were given, the instructors asked each student to complete an intervening assignment before selecting a copy of the passage. Thus, students came to the stacks of passages at different times, which allowed each student to make an independent selection rather than being influenced by the selection of someone else.

Student preference proved to be overwhelmingly in favor of pictures. Of the 145 students, 119 chose the passage with pictures,

while only 26 chose the passage without pictures. Pictures were preferred by 82% of the students.

A random group of students was later asked to explain their passage preference. Students who preferred the pictures typically said, "Pictures seem more interesting," "I was interested in seeing what the article was describing," and "I like pictures." For the non-picture group, most said, "It seemed shorter," or "It was closer to me." One student said, "Pictures can be distracting" and another said he preferred "to use his `mind`s picture` rather than rely on the picture in the text."

Conclusions

Four conclusions can be drawn from this research:

1. Including pictures in college history text material does not seem to increase a college student`s comprehension of the material, even when the pictures have been selected because they support the main ideas of the text.

2. Including pictures in college history texts does not seem to increase a college student`s ability to identify the vocabulary used in the material.

3. College students prefer material which includes pictures.

Summary

The answer to the question, "Do pictures make a difference?" is both "No" and "Yes." As demonstrated by the study, pictures do not seem to increase a student`s understanding of the text. Thus, there seems to be no cognitive benefit for the student which would warrant publishers' dramatically increasing the use of pictures. On the other hand, pictures seem to have an affective impact on students, as

evidenced in their overwhelming choice of illustrated text. Given this strong student preference, pictures do indeed seem to make an affective difference to the reader although the nature of that difference was not determined by this research.

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TABLE 1

Number of Pictures per History Textbook, 1960's vs 1980's

Popular in the 1960's	Popular in the 1980's
History of the Modern World	Western Civilization
Knopf, 1959	Norton, 1980 (9th Ed.)
Pages = 945	Pages = 956
Maps = 41	Maps = 46
Pictures = 16	Pictures = 753
Pages/Picture = 59.1	Pages/Picture = 1.3
Europe in Our Time	Civilization Past and Present
D.C. Heath, 1958	Scott, Foresman, 1978 (5th Ed.)
Pages = 913	Pages = 900
Maps = 30	Maps = 75
Pictures = 18	Pictures = 387
Pages/Picture = 50.7	Pages/Picture = 2.3
The National Experience	American History: A Survey,
Harcourt, 1963	Knopf, 1983 (6th Ed.)
Pages = 809	Pages = 976
Maps = 109	Maps = 70
Pictures = 157	Pictures = 238
Pages/Picture 5.15	Pages/Picture = 4.1

Table 2

Mean Scores for the Picture and the Non-Picture Groups on Measures of Reading Comprehension and Vocabulary

Variable	Number of Cases	Mean	Standard Deviation	Degrees Freedom	T-Value
Comprehension					
Pictures	72	7.44	1.87		
No Pictures	68	7.12	1.74		
				138	1.07
Vocabulary					
Pictures	72	6.75	1.54		
No Pictures	68	6.96	1.72		
				138	-.75

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